<u>Amendments to the Claims</u>:

1. (Cancelled) A method for performing analysis and prediction of economic markets comprising the steps of:

    initializing a space of economic models;

    executing one or more of said economic models to generate a corresponding one or more predicted time series;

    determining one or more fitnesses corresponding to said one or more economic models by comparing said plurality of predicted time series to actual data; and

    searching for at least one of said economic models having a maximal fitness.

2. (Cancelled) A method as in claim 1 further comprising the steps of:

    repeating said executing one or more of said economic models step, said determining one or more fitnesses step, and said searching step to adapt said space of economic 20 models to changes in the actual data.

3. (Cancelled) A method for generating models of an economy as in claim 1 further comprising the steps of:

    modifying said one or more economic models to increase said corresponding one or more fitnesses.

4. (Cancelled) A method as in claim 1 further comprising the steps of:

    combining at least two of said economic models to create at least one new economic model; and

    adding said at least one new economic model to said space of economic models.

5. (Cancelled) A method as in claim 4 wherein said combining step further comprises the step of:

> defining a space of stacking function of said economic models; and
>
> applying one or more genetic operators over said space of stacking functions to create said at least one economic model.

6. (Cancelled) A method as in claim 1 wherein said space of economic models comprise one or more members of the group consisting of AR(n), ARV, ARCH, GARCH, Black Scholes, Langevain equations, Levy and truncated Levy.

7. (Cancelled) A method as in claim 3 wherein said space of economic models comprises one or more hybrid models wherein said hybrid models comprise one or more hybrid models wherein said hybrid models comprise one or more components, each of said components contributing at least one portion of said predicted time series.

8. (Cancelled) A method as in claim 7 wherein said modifying said one ore more economic models step comprises the steps of:

> adjusting a permutation of said components of said hybrid models; and
>
> adjusting said contribution of said components of said hybrid models.

9. (Cancelled) A method as in claim 1 wherein said determining one or more fitnesses step comprises the step of:

> extracting a plurality of observables from said predicted time series.

10.(Cancelled) A method as in claim 9 wherein said

determining one or more fitnesses step further comprises the step of:

    comparing said observables to said actual data.

11. (Cancelled) A method as in claim 9 wherein said extracting step uses one or more techniques from the group consisting of visual analysis, principal component analysis, data mining, localized principal component analysis and independent component analysis.

12. (Cancelled) A method as in claim 9 further comprising the step of determining a fitness landscape of said one ore more fitnesses overs said space of economic models.

13. (Cancelled) A method as in claim 12 wherein said searching step comprises the step of:

    searching over said fitness landscape for said at
    least one economic model having the maximal
    fitness.

14. (Cancelled) A method as in claim 12 further comprising the step of:

    computing at least one probability distribution for
    said plurality of observables.

15. (Cancelled) A method as in claim 14 further comprising the step of:

    comparing said probability distribution for said
    plurality of observables to a corresponding
    probability distribution of said actual data;
    determining a distance between one of said economic
    models and another of said economic models ons said
    fitness landscape by computing a comparison between said
    probability distribution of said one economic model

and said probability distribution of said another economic model.

16. (Cancelled) A method as in claim 15 wherein said determining a distance step uses one or more techniques from the group consisting of the Randan-Nikodyn Thereom and the Kulback-Liebler method.

17. (Cancelled) A method as in claim 1 further comprising the step of:

determining at least one state of the economy from said actual data.

18. (Cancelled) A method as in claim 17 wherein said state of the economy comprises a current data and a plurality of past data for a plurality of assets in the economy.

19. (Cancelled) A method as in claim 18 wherein said current data and said past data comprise prices of said plurality of assets.

20. (Cancelled) A method as in claim 17 further comprising the step of repeating said determining at least one state of the economy step over time to assess a measure of stationarity or non-stationarity of the economy.

21. (Cancelled) A method as in claim 20 further comprising the step of repeating said executing one or more os said economic models step, said determining one or more fitnesses step, and said searching step to adapt said space of economic models to changes in said state of the economy.

22. (Cancelled) A method as in claim 21 further comprising the

step of tuning a rate of said searching for at least one of
said economic models having maximal fitness in accordance
with said measure of stationarity or non-stationarity of the 5
economy.

23. (Cancelled) A method as in claim 17 wherein
said predicted time series are determined from executing said
one or more economic models in accordance with said state of the
economy.

24. (Cancelled) A method as in claim 1 further comprising
the step of:

        performing risk minimization from said predicted
        time series.

25. (Cancelled) Computer executable software code
stored on a computer readable medium, the code for
performing analysis and prediction of economic markets, the
code comprising:

        code to initialize a space of economic models;
        code to execute one or more of said economic models
        to generate a corresponding one or more
        predicted time series;
        code to determine one or more fitnesses
        corresponding to said one or more economic models
        by comparing said plurality of predicted time series
        to actual data; and
        code to search for at least one of said economic
        models having a maximal fitness.

26. (Cancelled) A programmed computer system for performing
analysis and prediction of economic markets comprising at
least one memory having at least one region storing computer
executable program code and at least one processor for
executing the program code stored in said memory, wherein the
program code comprises:

code to initialize a space of economic models;
code to execute one or more of said economic models to generate a corresponding one or more predicted time series;
code to determine one or more fitnesses corresponding to said one or more economic models by comparing said plurality of predicted time series to actual data; and
code to search for at least one of said economic models having a maximal fitness.

27. (Cancelled) A system for performing analysis and making predictions of a securities market comprising
a model of the securities market comprising:
a plurality of dealer agents representing a corresponding plurality of market makers in the securities market, each of said dealer agents having at least one of a plurality of dealer strategies for setting a price of securities;
a plurality of investor agents representing a corresponding plurality of investors in the securities market, wherein said investor agent determines whether to buy or sell one or more of the securities at a given price;
at least one market model comprising one or more rules for exchanging the securities; and
a simulator for executing said model to perform analysis on the securities market.

28. (Cancelled) A system as in claim 27 wherein said plurality of dealer agents set a bid price, bid volume, offer price and offer volume of a security.

29. (Cancelled) A system as in claim 27 wherein said plurality of dealer strategies comprise static strategies.

30. (Cancelled) A system as in claim 27 wherein said plurality of dealer strategies comprise learning strategies.

31. (Cancelled) A system as in claim 27 wherein said plurality of dealer strategies comprise price discovery strategies.

32. (Cancelled) A system as in claim 27 wherein said plurality is of dealer strategies comprise parasitic strategies.

33. (Cancelled) A system as in claim 27 wherein said plurality of dealer strategies comprise a basic dealer strategy, said basic dealer strategies maintain its price on a security until it receives a predetermined number of trades on the buy or sell side wherein it decreases or increases its price on the security respectively.

34. (Cancelled) A system as in claim 27 wherein said plurality of dealer strategies comprise a price volume dealer strategy, said price volume dealer strategy deduces demand and supply for a security from market data and sets its price for the security in accordance with said demand and said supply.

35. (Cancelled) A system as in claim 27 wherein said plurality of dealer strategies comprises a new volume dealer strategy

wherein said new volume dealer strategy, said new volume dealer strategy raises or lowers its price on the security when it observes more buys or more sells respectively for the security.

36. (Cancelled) A system as in claim 27 wherein said plurality of dealer strategies comprise a parasitic dealer strategy, said parasitic dealer strategy waits for a sufficiently narrow spread with sufficient volume for a security before buying or selling the security inside the spread.

37. (Cancelled) A system as in claim 27 wherein said plurality of dealer strategies comprises a new parasite strategy, said new parasite strategy decides whether to buy or sell the security inside the spread based on observed excess supply and/or excess demand for the security.

38. (Cancelled) A system as in claim 27 wherein said plurality of dealer strategies comprise a matching dealer strategy, said matching dealer strategy learns connections between one or more observations and one or more actions and makes decisions based on said learned connections.

39. (Cancelled) A system as in claim 38 wherein said observations comprises one or more of the group consisting of inventory level, spread size, bid price relative to market value and trade volume.

40. (Cancelled) A system as in claim 38 wherein said actions comprises one or more of the group consisting of raising a price, increasing a bid and narrowing the spread.

41. (Cancelled) A system as in claim 27 wherein said plurality of dealer strategies comprise a classifier dealer strategy, said classifier dealer strategy learns pattern connections between one or more patterns of observations and one or more actions and makes decisions based on said learned pattern connections.

42. (Cancelled) A system as in claim 27 wherein said plurality of dealer strategies comprise a dynamical system dealer, said dynamical system dealer uses a discrete dynamical system to set its bid price, ask price and mean price.

43. (Cancelled) A system as in claim 27 wherein said plurality of investor agents comprises a degree of informedness representing a measure of said investor agents knowledge of a true value of a security.

44. (Cancelled) A system as in claim 27 wherein said one or more rule for exchanging securities comprises at least one tick price.

45. (Cancelled) A system as in claim 27 further comprising a plurality of parameters that quantify an ability of the market to track prices of the securities.

46.(Cancelled) A system as in claim 45 wherein said parameters comprises one or more members of the group consisting of the root mean square of the difference between a bid price and a time value, a root mean square of the difference between an ask price and a true value, an average value of a spread and a standard deviation of the spread.

47. (Cancelled) Computer executable software code stored on a computer readable medium, the code for performing analysis and making predictions of a securities market, the code comprising:
code to model the securities market comprising:

> code to represent a plurality of market makers in the securities market including a plurality of dealer strategies for setting a price of securities;
> code to represent a plurality of investors in the securities market and to determine whether to buy or sell one or more of the securities at a given price;
> code to represent the market including one or more rules for exchanging the securities; and
> code to simulate the model to perform analysis on the securities market.

48. (Cancelled) A programmed computer system for performing analysis and making predictions of a securities market comprising at least one memory having at least one region storing computer executable program code and at least one processor for executing the program code stored in said memory, wherein the program code comprises:

> code to model the securities market comprising:
> code to represent a plurality of market makers in the securities market including a plurality of dealer strategies for setting a price of securities;
> code to represent a plurality of investors in the securities market and to determine whether to buy or sell one or more of the securities at a given price;
> code to represent the market   Including one or more rules for exchanging the securities; and

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code to simulate the model to perform analysis on
the securities market.

49. (Cancelled) A method for creating a portfolio of assets
comprising the steps of:

initializing at lease one current portfolio of
assets having one or more desired properties;
generating at least one next portfolio of assets to
form said current portfolio, said next
portfolio having a smaller size then said current
portfolio;
repeating said generating step after replacing said
current portfolio with said next portfolio while
said next portfolio has the one or more desired
properties;
defining a size range having an upper limit equal
to the size of said current portfolio and a lower
limit equal to the size of said next portfolio; and
searching for an optimal portfolio of assets to
within said size range.

50. (Cancelled) A method as in claim 49 wherein said
generating at least one next portfolio comprises the steps
of:

sampling said assets from said at least one current
portfolio to form a plurality of candidate
portfolios; and
selecting said at least one portfolio from said
candidate portfolios.

51. (Cancelled) A method as in claim 50 wherein said selecting said at least one next portfolio step comprises the step of choosing said candidate portfolios that are optimal with respect to the one or more desired properties.

52. (Cancelled) A method as in claim 50 wherein said selecting said at least one next portfolio step comprises the step of:
choosing at least one of said candidate portfolios that is pare to optimal with respect to the one or more desired properties.

53. (Cancelled) A method as in claim 50 wherein said sampling of said assets has a uniform distribution.

54. (Cancelled) A method as in claim 50 wherein said sampling of said assets has a distribution that varies with time.

55. (Cancelled) A method as in claim 54 wherein said sampling step further comprises the steps of:
altering said distribution over time based on said one or more desired properties over previous choices of said candidate portfolios.

56. (Cancelled) A method as in claim 55 wherein said altering said distribution over time step boosting.

57. (Cancelled) A method as in claim 49 wherein said searching for an optimal portfolio of assets step comprises the steps of:
determining an intermediate size within said size range;
generating a lease on intermediate portfolio of assets of said intermediate size from said current portfolio; and

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if said intermediate portfolio has the one or
more discreet properties modifying said upper
limit of said size range to equal said
intermediate size;
else modifying said lower limit of said size
range 5 to equal said intermediate size.

58. (Cancelled) A method as in claim 57 wherein said searching
for an optional portfolio of assets to step further comprises the
step of:
repeating said steps of claim 53 to converge
to said optimal portfolio of assets.

59. (Cancelled) A method as in claim 49 wherein said size of
said current portfolio is defined as the number of said
assets in said current portfolio.

60. (Cancelled) A method as in claim 49 wherein said size of
said next portfolio is a fraction of said size of said current
portfolio.

61. (Cancelled) A method as in claim 60 wherein said fraction is
½.

62. (Cancelled) A method as in claim 60 wherein said
generating at least one next portfolio of assets step comprises
the step of:
tuning said size of said next portfolio.

63. (Cancelled) A method as in claim 49 further comprising the
step of:
determining the number of said at least one next
portfolios to generate.

64. (Cancelled) A method that as in claim 63 form the
comprising the step of timing said number of said at least on next
portfolios to generate.

65. (Cancelled) A method as in claim 49 wherein said one or more
desired properties comprise a low value at risk.

66. (Cancelled) Computer executable software code stored on a
computer readable medium, the code for creating a portfolio
of assets, the code comprising:

      code to initialize at lease one current portfolio
      of assets having one or more desired properties;

      code to generate at least one next portfolio of
      assets to form said current portfolio, said next
      portfolio having a smaller size then said current
      portfolio;

      code to repeat said generating step after
      replacing said current portfolio with said next
      portfolio while said next portfolio has the one
      or more desired properties;

      code to define a size range having an upper limit
      equal to the size of said current portfolio and a
      lower limit equal to the size of said next
      portfolio; and

      code to search for an optimal portfolio of assets to
      within said size range.

67. (Cancelled) A programmed computer system for creating a portfolio of assets comprising at least one memory having at least one region storing computer executable program code and at least one processor for executing the program code stored in said memory, wherein the program code comprises:

> code to initialize at lease one current portfolio of assets having one or more desired properties;
> code to generate at least one next portfolio of assets to form said current portfolio, said next portfolio having a smaller size then said current portfolio;
> code to repeat said generating step after replacing said current portfolio with said next portfolio while said next portfolio has the one or more desired properties;
> code to define a size range having an upper limit equal to the size of said current portfolio and a lower limit equal to the size of said next portfolio; and
> code to search for an optimal portfolio of assets to within said size range.

68. (Currently Amended) A method for determining an optimal ~~optimizing a~~ portfolio of assets comprising the steps of:

determining a fitness landscape representation ~~over a space~~ with respect to a set of portfolios of assets;

determining at least one optimal searching distance in said fitness landscape representation; ~~and~~

searching for optimal ~~optional~~ ones of said portfolios of assets at said at least one optimal searching distance

distances.; and presenting results from said searching for said optimal ones of said portfolios of assets on an electrical output device.

69.   (Currently Amended) A method as in claim 68 wherein each of said portfolios of assets comprises is defined as a vector corresponding to said assets of each corresponding portfolio wherein each element of said vector identifies the umber a number of units of each of said corresponding assets in each of said portfolios.

70.   (Currently Amended) A method as in claim 69 wherein said at least one searching distance distances between a first portfolio of said portfolios and the a second portfolio one of said portfolios is defined as the difference between said vector of said first portfolio and said vector of said second portfolio.

71.   (Currently Amended) A method as in claim 68 wherein said fitness of said landscape representation comprises a value at of risk.

72.   (Currently Amended) A method as in claim 68 wherein said determining a fitness landscape representation step comprises the step of inferring said fitness landscape representation from historical data.

73.   (Currently Amended) Computer executable software code stored on a computer readable medium, the code for determining an optimal optimizing a portfolio of assets, the code comprising:
        code to determine a fitness landscape representation over a space with respect to a set of portfolios of assets;

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code to determine at least one optimal searching distance in said fitness landscape representation; and

code to search for optimal optional ones of said portfolios of assets at said at least one optimal searching distance distances.; and

code to present results from said searching for said optimal ones of said portfolios of assets on an electrical output device.

74. (Currently Amended) A programmed computer system for determining an optimal optimizing a portfolio of assets comprising at least one memory having at least one region storing computer executable program code and at least one processor for executing the program code stored in said memory, wherein the program code comprises:

code to determine a fitness landscape representation over a space with respect to a set of portfolios of assets;

code to determine at least one optimal searching distance in said fitness landscape representation; and

code to search for optimal optional ones of said portfolios of assets at said at least one optimal searching distance distances.; and

code to present results from said searching for said optimal ones of said portfolios of assets on an electrical output device.

75. (Withdrawn) A method for creating a portfolio of a plurality of assets comprising the steps of:

determining a plurality of anti-correlated families wherein each of said anti-correlated families contains two or

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more of said plurality of assets that are
anti-correlated; and

determining one or a more perspective portfolios of
said plurality of assets from said plurality
of anti-correlated families.

76. (Withdrawn) A method in claim 75 further
comprising the step of:

receiving one or more time series corresponding
to one or more of said plurality of assets.

77. (Withdrawn) A method as in claim 76 further
comprising the step of:

determining correlations among said plurality of
assets.

78. (Withdrawn) A method as in claim 75 wherein said
determining a plurality of anti-correlated families step
comprises the steps of:

selecting at least one of said plurality
of assets to be a first member of one of said
anti-correlated families;

determining one or more of said plurality of assets
having a value of said correlation with said first
member of said anti-correlated family that is less
than a negative limit; and
including said one or more assets
having a correlation value that is less than
the limit as additional members in said anti-
correlated family.

79. (Withdrawn) A method as in claim 78 further comprising the step of separating said steps of claim 4 for another one of said plurality of assets to determine another of said plurality of anti-correlated families.

80. (Withdrawn) A method as in claim 77 further comprising the step of:

> eliminating drift from said one or more time series to create corresponding one or more detrended time series.

81. (Withdrawn) A method as in claim 80 wherein said correlations among said plurality of assets is determined from said one or more time series.

82. (Withdrawn) A method as in claim 77 wherein said correlations are shifted in time.

83. (Withdrawn) A method as in claim 75 wherein said determining one or more perspective portfolios step comprises the step of selecting one of said plurality of anti-correlated families;

> determining percentages of said assets from said selected family to include in one of said perspective portfolios.

84. (Withdrawn) A method as in claim 83 further comprising the steps of repeating said selecting step and said determining a percentage of each of said assets step with different ones of said anti-

correlated families to determine said one or more perspective portfolios.

85. (Withdrawn) A method as in claim 83 wherein said percentages of said assets from said selected family are determined from said perspective portfolio with a minimal variance.

86. (Withdrawn) A method as in claim 75 further comprising the step of choosing at least one of said perspective portfolios as said portfolios of assets.

87. (Withdrawn) A method as in claim 86 for the comprising the step of optimizing an expected return of said portfolio of assets.

88. (Withdrawn) Computer executable software code stored on a computer readable medium, the code for creating a portfolio of a plurality of assets, the code comprising:

> code to determine a plurality of anti-correlated families wherein each of said anti-correlated families contains two or more of said plurality of assets that are anti-correlated; and
> code to determine one or a more perspective portfolios of said plurality of assets from said plurality of anti-correlated families.

89. (Withdrawn) A programmed computer system for creating a portfolio of a plurality of assets comprising at least one memory having at least one region storing computer executable

program code and at least one processor for executing the
program code stored in said memory, wherein the program code
comprises:

        code to determine a plurality of anti-correlated
        families wherein each of said anti-correlated
        families contains two or more of said plurality of
        assets that are anti-correlated; and
        code to determine one or a more perspective
        portfolios of said plurality of assets from said
        plurality of anti-correlated families.

90. (Withdrawn) A method of modeling a portfolio of assets comprising
the step of:

        defining a probability distribution of the value of
        the portfolio of assets with two or more
        Gaussian distributions.

91. (Withdrawn) A method as in claim 90 wherein said two or
more Gaussian distributions comprise at least one parameter.

92. (Withdrawn) A method as in claim 91 further comprising the
step of:

        receiving historical data on the value of the
        portfolio of assets; and
        determining values for said at least one parameter
        from said historical data.

93. (Withdrawn) A method as in claim 91 wherein said defining a
probability distribution a probability distribution step
comprises the step of:

        defining said probability distribution as a sum of
        said two or more Gaussian distributions.

94. (Withdrawn) A method as in claim 93 wherein said defining said probability distribution as a sum step comprises the step of defining said probability distribution as:

$$g_m \ (n_i, \ T_i) \ = \ \sum_{i=1}^{m} \ n_i g \ (1, \ T_i)$$

n, represent normalization parameters

T_i represent variance

95. (Withdrawn) A method that as in claim 94 wherein said defining said probability distribution as a sum step further comprises the step of:

defining a plurality of normalization conditions as:

$\sum n_i \ = \ 1$

$\sum n_i \ T_i \ = \ 1$

$\sum n_i \ T_i^2 \ = \ 1$

96. (Withdrawn) A method as in claim 90 for further comprising the step of:

computing a value at risk from said probability distribution of said two or more Gaussian distributions.

97. (Withdrawn) A method as in claim 90 for further the step of:
computing an option price from said probability distribution of said two or more Gaussian distributions.

98. (Withdrawn) A method as in claim 97 wherein said computing an options price step comprises the steps of:

determining an option pricing formula as:

$$c = e^{-r(T-t)} \int_{x}^{\infty} (S_T - X) g(S_t) dS_T$$

$$= S \ [n_1 N(T_1; \ d_i) + n_2 N \ (\ T_2; \ d_i) \ -Xe^{-r(T-t)} \ Erly(T_i; \ d_2)$$

wherein:

T   represents variance

N   represents normal density function

 t represents time

99. (Withdrawn) Computer executable software code stored on a computer readable medium, the code for modeling a portfolio of assets, the code comprising:

> code to define a probability distribution of the value of the portfolio of assets with two or more `Gaussian distributions.

100. (Withdrawn) A programmed computer system for modeling a portfolio of assets comprising at least one memory having at least one region storing computer executable program code and at least one processor for executing the program code stored in said memory, wherein the program code comprises:

> code to define a probability distribution on the value of the portfolio of assets with two or more Gaussian distributions.